

US009636256B2

(12) United States Patent Hegels

(10) Patent No.: US 9,636,256 B2 (45) Date of Patent: May 2, 2017

(54) METHOD AND APPARATUS FOR CALCULATING A LASER SHOT FILE FOR USE IN AN EXCIMER LASER

(71) Applicant: Technolas Perfect Vision GmbH,

Munich (DE)

(72) Inventor: Ernst Hegels, Kirchheim (DE)

(73) Assignee: TECHNOLAS PERFECT VISION

GMBH, Munich (DE)

(*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 95 days.

(21) Appl. No.: 14/134,541

(22) Filed: Dec. 19, 2013

(65) **Prior Publication Data**

US 2015/0173946 A1 Jun. 25, 2015 US 2016/0346120 A9 Dec. 1, 2016

Related U.S. Application Data

- (63) Continuation of application No. 12/375,428, filed as application No. PCT/EP2007/057782 on Feb. 27, 2007, now abandoned.
- (51) Int. Cl.

 A61B 18/20 (2006.01)

 A61F 2/14 (2006.01)

 A61F 2/16 (2006.01)

 A61F 9/008 (2006.01)

 B23K 26/38 (2014.01)

(52) U.S. Cl.

CPC **A61F 9/0084** (2013.01); **A61F 9/00812** (2013.01); **B23K 26/38** (2013.01); **A61F** 9/00814 (2013.01); **A61F 2009/00878** (2013.01)

(58) Field of Classification Search

CPC .. A61F 9/008; A61F 9/00802; A61F 9/00804;

(56) References Cited

U.S. PATENT DOCUMENTS

5,425,727 A	6/1995	Koziol
5,777,719 A	7/1998	Williams
5,891,132 A	4/1999	Hohla
5,928,221 A	7/1999	Sasnett
	(Continued)	

FOREIGN PATENT DOCUMENTS

DE	19727573	5/1998	
DE	20 2005 018911	3/2006	
	(Co	(Continued)	

OTHER PUBLICATIONS

US 5,423,802, 06/1995, Marshall (withdrawn) (Continued)

Primary Examiner — Ahmed Farah (74) Attorney, Agent, or Firm — Thompson Hine LLP

(57) ABSTRACT

The invention relates to a method and apparatus for calculating a laser shot file for use in an excimer laser comprising the steps of providing information with respect to a desired ablation profile, calculating the shot density of the desired ablation profile, using a cost function for placing laser shots of the excimer laser on grid positions wherein a threshold value is determined based on the calculated shot density of the desired ablation profile.

15 Claims, 8 Drawing Sheets

